

TECHNO-ECONOMIC EVALUATION OF A CONCEPTUAL BATTERY MANUFACTURING PLANT

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ABSTRACT

A conceptual flowsheet was developed for a battery manufacturing plant with a preliminary first-pass or Class 5 techno-economic evaluation methodology. Publicly available and internal sources of references, models, tools and data at CSIRO were utilised for this study. This assessment indicates that for a yearly production of 5.3 GWh battery storage, and a manufacturing plant situated in Australia, it would require a capital investment of over \$650 million. A cash flow analysis over 20 years project life estimated the NPV of \$649 million. The operating cost was largely influenced by material inputs. Graphite was identified as a key input material due to its weight in lithium ion batteries and higher price. A 20% increase in graphite costs can potentially reduce the NPV by more than \$150 million.

The levelised cost of storage (LCOS) is primarily driven by the usage regime and performance capacity of the battery. The usage profile (charge cycle frequency) is the likely to be the most important driver of the LCOS and likely to meet the government target of \$100/MWh. A 30% reduction in manufacturing production costs would have LCOS of \$99.1, or a doubling of the battery asset lifetime from 10 to 20 years may have LCOS of \$89.6. Increasing from 1 to 1.5 cycles/day, the LCOS is expected to be \$88.9. This warrants research and development should focus on increasing cycle number or decreasing charging time, battery service life extension and by producing low cost battery metals such as lithium and graphite.

Keywords (use Keywords style): Lithium ion batteries, techno-economic evaluation, flowsheeting, cost.